# THE ASSOCIATION FOR THE STUDY OF PEAK OIL AND GAS

"ASPO"

# NEWSLETTER No. 82 – OCTOBER 2007

**ASPO started as a European network of scientists and others, having an interest in determining the date and impact of the peak and decline of the world's production of oil and gas, due to resource constraints. Now, associates are active in Australia,** Austria, Belgium**, Canada, China,** Croatia, Denmark, Egypt**,** Finland, **France, Germany,** Hong Kong**, Ireland,** Isle of Man**,** Israel**, Italy,** Luxembourg**, Japan,** Korea, Malaysia, **Mexico, Netherlands, New Zealand,** Norway **Portugal,** Russia**,** Singapore, Slovenia, **South Africa, Spain,** Sweden**, Switzerland, United Kingdom, USA,** and Venezuela**.**

(The formally constituted entities are shown in bold face)

***Missions:***

***1. To evaluate the world's endowment and definition of oil and gas;***

***2. To study depletion, taking due account of economics, demand, technology and politics;***

***3. To raise awareness of the serious consequences of oil and gas decline for Mankind.***

Foreign language editions are available as follows:

Spanish: www.crisisenergetica.org

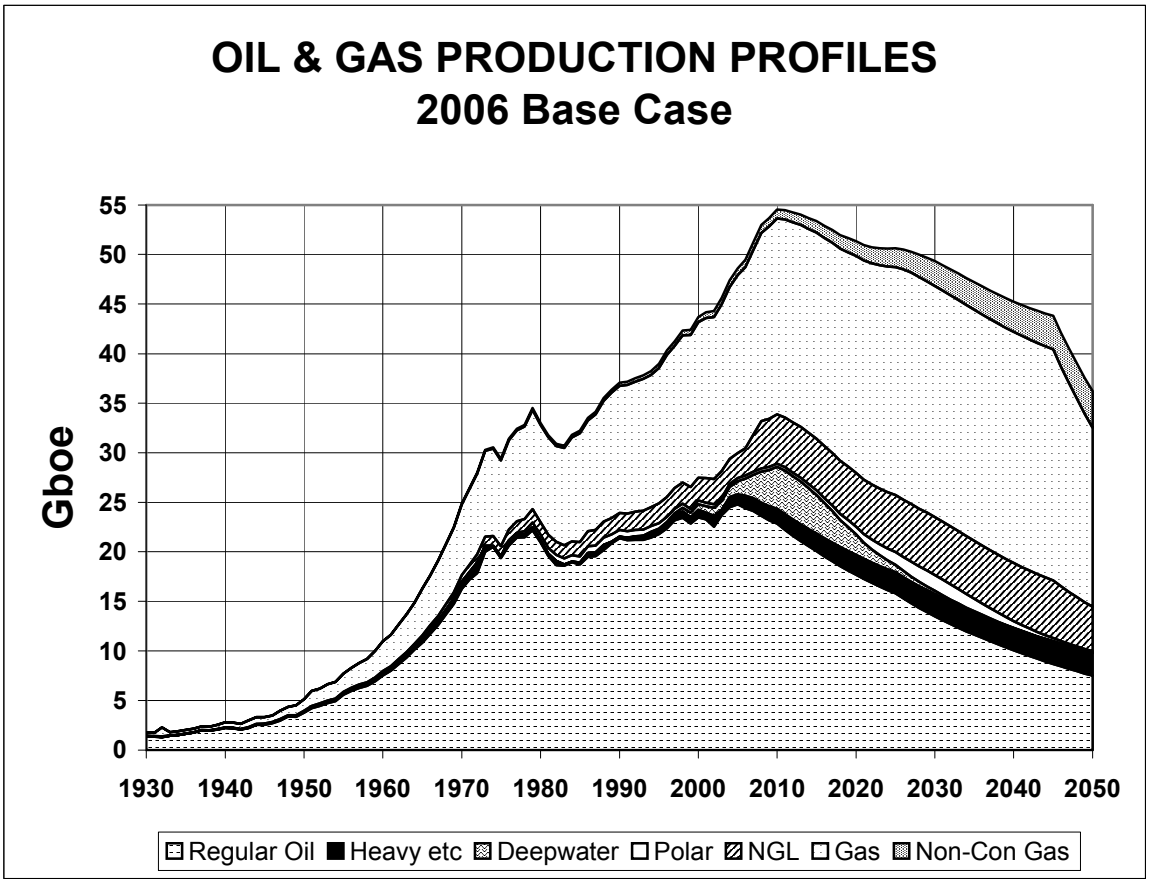
French: www.oleocene.org (press "Newsletter")

**CONTENTS**

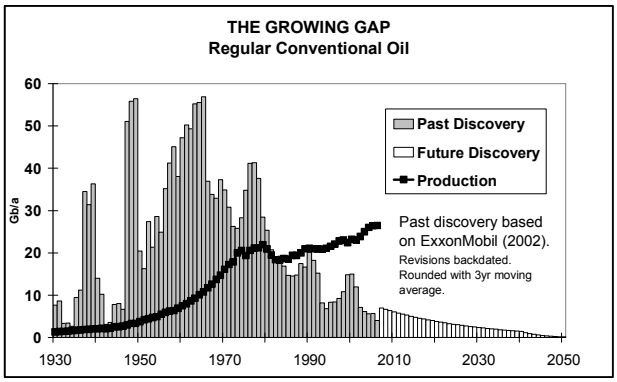


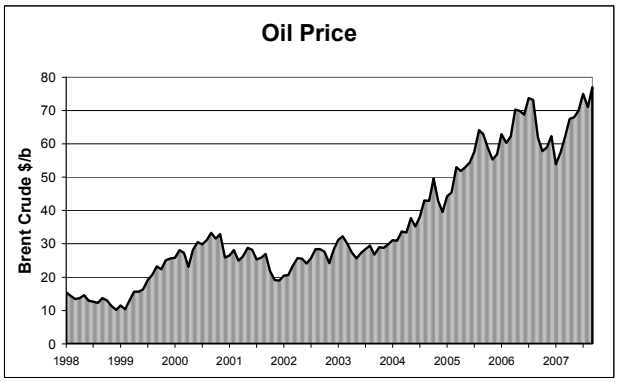
**Index of Country & Regional Assessments with Newsletter Reference** (*revised)

## *The General Depletion Picture*




| ESTIMATED PRODUCTION TO 2100 | | | | | | | | | | End 2006 |
|---|---|---|---|---|---|---|---|---|---|---|
| Amount | | | Gb | Annual Rate - Regular Oil | | | | | | Gb | Peak |
| Regular Oil | | | | Mb/d | 2006 | 2010 | 2015 | 2020 | 2030 | Total | Date |
| Past | Future | | Total | US-48 | 3.6 | 3.0 | 2.3 | 1.8 | 1.1 | 200 | 1970 |
| Known Fields | | New | | Europe | 4.5 | 3.6 | 2.5 | 1.7 | 0.8 | 76 | 2000 |
| 1001 | 773 | 126 | 1900 | Russia | 9.5 | 9.5 | 7.6 | 6.1 | 3.9 | 230 | 1987 |
| | 899 | | | ME Gulf | 20 | 20 | 20 | 20 | 18 | 693 | 2015 |
| All Liquids | | | | Other | 29 | 27 | 22 | 19 | 13 | 701 | 2004 |
| 1102 | 1398 | | 2500 | **World** | **67** | **63** | **55** | **48** | **37** | **1900** | 2005 |
| 2006 Base Scenario | | | | Annual Rate - Other | | | | | | | |
| M.East producing at capacity | | | | Heavy etc. | 2.8 | 4 | 5 | 5 | 6 | 212 | 2030 |
| (anomalous reporting corrected) | | | | Deepwater | 3.6 | 12 | 11 | 6 | 1 | 66 | 2011 |
| *Regular Oil* excludes Heavy Oils | | | | Polar | 0.9 | 1 | 1 | 2 | 4 | 52 | 2030 |
| (inc. tarsands, oilshales); Polar & | | | | Gas Liquid | 7.6 | 8 | 9 | 9 | 10 | 261 | 2035 |
| Deepwater Oil; & gasplant NGL | | | | *Rounding* | | | | -1 | 2 | 8 | |
| Revised 30/09/2007 | | | | **ALL** | **82** | **87** | **80** | **70** | **60** | **2500** | 2010 |



### *867. Polar Oil*

The melting of the Arctic Ice Cap due to global warming has led to hopes that the area can be opened to exploration, even prompting Russia to claim territorial rights by planting its flag on the seabed near the Pole. It is quite normal for areas that are closed to exploration to be deemed to be full of oil. The ANWR wildlife reserve in Alaska and the Spratly Islands in the South China Sea are well known examples. There is also a big difference between looking for oil and finding it, but wells have to be drilled to find out what the prospects truly are. It is therefore wise to treat Polar Oil and Gas as *Non-conventional* both because of the harsh operating environment and the great uncertainty as to the eventual results.

Generally speaking, it can be said that rich oil source-rocks were deposited in tropical regions, where the algae responsible for them proliferated, but some such deposits have been transported to high latitudes by plate tectonic movements. This itself suggests that rich source-rocks are likely to be confined to relatively early sequences, such as the Triassic, as known in Alaska and Svalbard. By and large, the plate-tectonic movements were northward, leaving the southern hemisphere and particularly Antarctica under-endowed.

The onshore Arctic regions of Alaska, Canada, Norway and Russia have been fairly thoroughly explored, so the main new area of interest concentrates on offshore Russia, where some large sedimentary basins have been identified. Arctic Greenland is a third area of possible interest.

The experience from the Barents Sea off Norway indicates that the Earth's crust in the Arctic regions has been subject to substantial vertical movements due to the weight of fluctuating ice-cap in the geological past. Such movements have two adverse effects : first, source-rocks that currently lie at an oil generating depth may have previously been much deeper, such that their oil content has been converted to gas; and second, seal integrity may have been impaired. Generally, the evidence to-date suggests that the area is primarily gas-prone, and that such oil and gas as were trapped have been subject to re-migration and dissipation. It is the sort of domain that gives hints of encouragement that are rarely fulfilled. That said, there can always be almost freak occurrences, such for example as the Prudhoe Bay field in Alaska.

The depletion model followed in this newsletter makes the assumption that total production from Alaska will amount to 22 Gb, of which almost 15 Gb have already been extracted. Production, which peaked in 1988 at 2022 kb/d, has since fallen to 741 kb/d, and is expected to continue to decline at about 4% a year. It is tentatively assumed that other Arctic regions may contain about 30 Gb peaking in 2030 at 4 Mb/d. It is very difficult to determine the gas potential and future production levels, but endowment estimates in the range of 2000 - 2800 Tcf of producible gas are indicated. The extraction of this gas will depend on the construction of lengthy pipelines under the most extreme operating conditions.

Rather more important perhaps than the actual potential is the implication of looking in these regions. Certainly, no one would consider drilling in the hostile Polar environments, especially offshore, if there were any other better options left elsewhere. While some seismic surveys will probably be undertaken and a few exploration wells drilled the impact on climate change will probable not be significant.

### *868. Peak Oil hits a political manifesto*

The Conservative Party, which is the principal opposition party in Britain, has issued an important report describing its political objectives. The following extract demonstrates an awareness of Peak Oil and its serious impact:

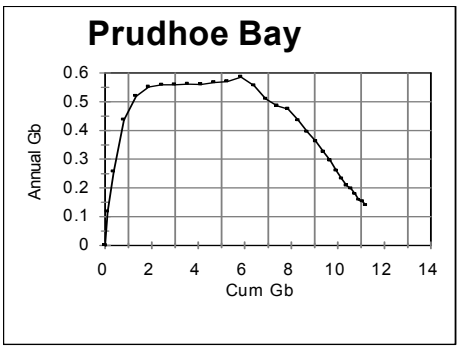
*Peak Oil theory refers to the point at which half the world's accessible oil reserves have been extracted. After crossing this threshold, oil production starts to decline, with future demand outstripping supply. The resulting increase in oil prices has vast economic, social and political implications, with conflict between nations competing for ever-scarcer oil resources. A number of authorities believe that we will have passed the point of world peak oil production in 2008.* *(Reference furnished by Mark Griffiths)*

### *869. Peak Oil and Geology*

The Geological Society held a major bicentenary conference in London on September 10-12, considering four main themes : *Resources, Environment, Earth & Planetary Interiors and the Earth System*.

The *Resources Theme* opened with a lecture by C.J.Campbell, entitled *Peak Oil : A Geological Reality*, being followed by presentations from representatives of BP, British Gas, ExxonMobil, Shell and Schlumberger which also directly and indirectly covered the *Peak Oil* issue.

The oil company presentations stressed the remarkable technological advances in the fields of exploration and production, showing how the smallest and most subtle prospects can now be identified, and how untested prospects remain can be identified beneath the Polar ice-cap. BP paraded the well-known example of apparent reserve growth at its Prudhoe Bay Field in Alaska suggesting that technology had increased reserves from 9 Gb to 13 Gb, without adding that the indicated growth refers to so-called *Proved Reserves*,




as defined by Stock Exchange rules, which encourage conservative initial reporting. The straight decline rate, as illustrated, in fact shows that the present indicated size of the field has long been evident.

The perceptive observer might ask if the new interest in the extreme environment of the Polar regions implies that there is nowhere else easier left to explore, and wonder how much the small, difficult and subtle prospects, as identified by new sophisticated technology, may contribute to world supply. The bulk of the world's supply currently comes from giant fields found long ago, which were not easily missed.

Several speakers emphasised above-ground constraints, as a growing number of countries come to recognise the importance of conserving their remaining resources for their own use, which in fact implies that they begin to recognise the finite nature of their endowment.

Kurt Rudolph of ExxonMobil was the most forthright, presenting a genuine discovery trend, very similar to that depicted in the *Growing Gap*, illustrated above at the beginning of the Newsletter. He also spoke of what he termed the *winner's curse,* referring to the ferocious competition for exploration rights, whereby the successful bidder often faces excessively onerous terms. He said that this situation was leading companies to pursue *high-risk, high potential* plays. This is indeed well illustrated, for example, by his company's decision to take an option to the Goban Spur off Ireland: it is a, long-known, feature whose adverse geology has deterred exploration over the past thirty years, but it is large and subject to favourable terms.

In short, the industry presented compelling evidence for *Peak Oil*, but could not quite bring itself to recognise it as such.

### *870. Discovery in 2006*

Accurate information on discovery is as usual very difficult to come by, but one informed source with a major oil company has recently reported that the total discovery for 2006 amounted to 5.2 Gb, of which we may suppose that about 4 Gb referred to *Regular Conventional.* If so, the world consumed about six barrels for every one found, as it dug into what is left from earlier discovery.

### *871. Oil Price and Financial Chaos*

Oil prices rose again during the month to near record levels, as did coal prices, implying that there is very little available spare oil capacity, although price surges are often self-fulfilling as operators and speculators have every financial incentive to build storage in such circumstances. Those with sharp noses will judge the height of the spike and buy forward before opening the tap to drain the tank and depress the price. Volatile trading can be expected as the crisis deepens.

The financial markets continue to be in disarray as debt increasingly loses its collateral. The dollar, which was formerly a prestigious world trading currency in which foreign governments held their savings, is also losing its lustre. Foreign dollar holdings have apparently fallen by 48 billion over the past month. The Bank of England has been forced to prop up a major British mortgage lender, as nervous savers withdraw their savings. The former Chairman of the Federal Reserves has said that interest rates may have to rise to 10% to counter inflation, but interest itself is a form of false money supply, not reflecting goods or services.

Growing numbers of people seem to be perceiving that energy supply is set to decline in the years ahead, which in turn spells a contracting rather than an expanding economy. It is not surprising therefore that debt premised on ever onward expansion loses its illusory collateral. It has been calculated that current oil supply is equivalent in energy terms to that furnished by 22 billion slaves working 24 hours a day.

### *872. World Energy Council reports Peak Oil*

The *2007 Survey of Energy Resources* by the World Energy Council contains an excellent article by the Federal Institute for Geosciences and Natural Resources (BGR) of Germany. It describes the reporting and definition of oil reserves, illustrating a production profile, which shows a peak shortly after the end of the present decade. This paper from the official institute of the German Government is broadly in line with the new position adopted by the International Energy Agency, which advises the OECD Governments. It appears that a new consensus is forming to address the reality of the situation.

### *873. 6th International ASPO Conference*

The 6th International ASPO Conference was successfully held in Cork in Ireland on September 17th and 18th as previously advertised. It attracted over 300 participants from around the world and much favourable comment. The Conference was opened by Dr James Schlesinger, a former US Secretary of Energy, who declared that the Peak Oil argument had been effectively won. After a lively debate on many important issues, Ireland's Minister of Energy gave a closing address stressing that it was now time to plan and prepare for the consequences. Great credit goes to Richard O'Rourke and Jack Zagar of ASPO-Ireland for organising a successful event, made possible by generous local sponsorship and keen official support. Some of the participants went on to *après-pic*, organised by Bobbins Campbell in Killarney where they had the chance to meet and discuss matters of mutual interest in a beautiful lakeside setting.

### *874. Three New Books*

A splendid book, entitled *The Big Earth Book – Ideas and solutions for a planet in crisis* by James Bruges has been published (ISBN 13 978-1-901970-87-6). It covers the environmental and energy issues facing the modern world in a lucid and very readable style. But its particular contribution is to explain the current financial and economic system that becomes increasingly outdated and ill-equipped to deal with the evolving situation.

The second is a small booklet, entitled *Living through the Energy Crisis – Preparing for a low-energy world* by C.J.Campbell and Graham Strouts (ISBN 0 9547855 -1-7). It evaluates the oil depletion issues through the medium of an imaginary judicial enquiry before reviewing various practical measures that individuals and communities can take to reduce their energy consumption and become more self sufficient. (It is available through ASPO-Ireland.org at €10 plus postage).

The third is BioPower Energy Savings, which outlines the many practical household steps that people can take to reduce their energy consumption (info@biopower.com)

### *875. Conflict in Myanmar*

It transpires that the recent disturbances in Myanmar (Burma) were triggered by the government's decision to reduce the subsidy on fuel, such that the cost of diesel has doubled, putting further pressures on the economy.

The country belonged to the British Empire until 1948, being run through the India Administration. There were pressures for independence from British rule, led in part by Buddhist monks, and some elements within the country supported the Japanese during the Second World War to the same end. The tensions between different regions and tribal groups persisted after independence, which probably led to the formation of a military government able to exert national authority. Whatever their internal tensions, the Burmese themselves seem to be a delightful people of an ancient cultural heritage.

Burma is one of the oldest oil countries in the world with the first exploration well being drilled in 1864. The largest field, Chauk-Lanywa, was found in 1901 containing 400 Mb of oil and 198 Mcf of gas. Approximately 1.1 Gb of oil and 20 Tcf of gas has been discovered, of which respectively 560 Mb of oil and 18 Tcf of gas remain to be produced. Several significant gas finds have been made in recent years offshore.

Refinery capacity is limited meaning that the country relies heavily on imported diesel fuel and is therefore exposed to the current high prices, explaining why the Government was forced to reduce the subsidy. It may be supposed that China would welcome an opportunity of import gas from Burma and might find it easier to deal with a strong government than whatever a move to democratic government might deliver. It is well said that oil (or in this case gas) and politics are never far apart. Burma is not alone in having an autocratic Government.

### *876. IEA Medium Term Oil Market Report*

The International Energy Agency evaluated in detail the Peak Oil issue at least ten years ago, having access to sound industry data, and indeed issued a coded message in its 1998 World Energy Outlook showing that demand outpaced supply in 2010, save for the entry of what it termed *Unidentified Unconventional Oil.* Production from this miraculous new source was indicated to rise from zero to 19.1 Mb/d over the ensuing ten years to supply as much as one-fifth of the world's needs by 2020. It equally miraculously disappeared from subsequent issues of the World Energy Outlook, being matched by a convenient yet implausible corresponding increase in Non-Opec production.

In July 2007, the IEA issued a Mid-Term Market Report opening with the words: *Despite four years of high oil price, this report sees increasing market tightness beyond 2010*. This alone suggests that it begins to recognise that market pressures are subservient to resource constraints imposed by Nature.

The report lists its production forecast to 2012 for selected countries as reproduced in the following table, which compares them with the current forecast for *Regular Conventional* used by this newsletter. As usual, there is confusion over the definition of what is being measured, as the IEA does not distinguish *Regular Conventional* from the other categories. The table also shows 2006 production as estimated by the Oil & Gas Journal giving a world total of 72.49 Mb/d compared with 84.36 Mb/d for 2007 as estimated by the IEA,. The IEA does however show various countries passing their peaks, as highlighted in bold face in the table. Surprisingly enough, the IEA world estimates are remarkably close to those for all categories in our database up to 2010. The gap widens thereafter to as much a 6 Mb/d by 2012. If the IEA made a longer range forecast, no doubt it would be obliged to show a precipitate subsequent decline to respect the resource constraints. While it is recognised that all numbers in such evaluations are wrong, because of the unreliable reporting practices in many spheres, the range of uncertainty seems to be narrowing. In general it could be said that the IEA is at last finding it expedient to approach the *Confessional* as Nature reveals her hand.

| PRODUCTION Mb/d | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | **2006** | **2007** | | **2008** | | **2009** | | **2010** | | **2011** | | **2012** | |
| | O&GJ | IEA | ASPO | IEA | ASPO | IEA | ASPO | IEA | ASPO | IEA | ASPO | IEA | ASPO |
| Russia | 9.48 | 9.95 | 9.48 | 10.14 | 9.48 | 10.41 | 9.48 | 10.59 | 9.48 | **10.61** | 9.07 | 10.53 | 8.68 |
| S.Arabia | 8.99 | 10.80 | 8.97 | 11.17 | 8.97 | 11.46 | 8.97 | 12.17 | 8.97 | 12.31 | 8.97 | 12.57 | 8.97 |
| USA | 5.14 | 7.44 | 3.46 | 7.43 | 3.29 | 7.51 | 3.13 | **7.59** | 2.97 | 7.55 | 2.82 | 7.38 | 2.68 |
| Iran | 3.85 | 3.96 | 3.86 | 4.00 | 3.86 | 4.00 | 3.86 | 3.66 | 3.86 | **3.82** | 3.86 | 3.77 | 3.86 |
| China | 3.70 | 3.81 | 3.53 | 3.86 | 3.38 | 3.87 | 3.24 | **3.89** | 3.11 | 3.88 | 2.98 | 3.89 | 2.86 |
| Venezuela | 2.56 | 2.62 | 1.45 | 2.62 | 1.45 | 2.62 | 1.45 | 2.62 | 1.45 | 2.62 | 1.45 | 2.62 | 1.45 |
| Canada | 2.50 | 3.29 | 1.15 | 3.33 | 1.06 | 3.39 | 0.98 | 3.49 | 0.91 | 3.63 | 0.84 | 3.87 | 0.77 |
| Norway | 2.47 | **2.51** | 2.29 | 2.40 | 2.12 | 2.26 | 1.97 | 2.20 | 1.83 | 2.18 | 1.70 | 2.05 | 1.58 |
| UAE | 2.45 | 2.88 | 2.44 | 2.89 | 2.44 | 2.85 | 2.44 | 2.90 | 2.44 | 3.17 | 2.44 | 3.38 | 2.44 |
| Nigeria | 2.22 | 2.47 | 2.34 | 2.37 | 2.27 | 2.48 | 2.20 | 2.62 | 2.14 | 2.78 | 2.08 | 2.84 | 2.02 |
| Kuwait | 2.20 | 2.65 | 2.19 | 2.83 | 2.19 | 2.84 | 2.19 | 2.98 | 2.19 | 3.07 | 2.19 | 3.06 | 2.19 |
| Iraq | 1.92 | 2.40 | 1.90 | 2.40 | 1.89 | 2.40 | 1.89 | 2.40 | 1.89 | 2.40 | 1.99 | 2.40 | 2.08 |
| Brasil | 1.71 | 2.22 | 0.39 | 2.56 | 0.37 | 2.71 | 0.34 | 2.79 | 0.32 | 3.02 | 0.30 | 3.27 | 0.28 |
| Libya | 1.70 | 1.75 | 1.79 | 1.84 | 1.87 | 1.84 | **1.97** | 1.88 | 2.07 | 1.94 | 2.01 | 1.92 | 1.96 |
| UK | 1.48 | **1.63** | 1.58 | 1.51 | 1.47 | 1.41 | 1.36 | 1.26 | 1.26 | 1.14 | 1.17 | 1.01 | 1.08 |
| Angola | 1.39 | 1.67 | 0.53 | 2.00 | 0.51 | 2.13 | 0.48 | 2.02 | 0.46 | 2.09 | 0.44 | 2.17 | 0.41 |
| Algeria | 1.35 | 1.38 | 1.30 | 1.42 | 1.26 | 1.51 | 1.21 | 1.60 | 1.17 | **1.61** | 1.13 | 1.56 | 1.09 |
| Indonesia | 0.89 | 0.87 | 0.86 | 0.88 | 0.84 | 0.87 | 0.81 | 0.90 | 0.78 | **0.94** | 0.76 | 0.90 | 0.73 |
| Qatar | 0.82 | 0.95 | 0.79 | 1.05 | 0.76 | 1.10 | 0.72 | 1.16 | 0.70 | **1.17** | 0.67 | 1.16 | 0.64 |
| Oman | 0.74 | 0.70 | 0.71 | 0.68 | 0.68 | 0.69 | 0.66 | 0.71 | 0.63 | 0.73 | 0.61 | 0.76 | 0.59 |
| Malaysia | 0.74 | 0.71 | 0.70 | 0.74 | 0.67 | 0.73 | 0.64 | 0.74 | 0.61 | 0.73 | 0.58 | 0.79 | 0.55 |
| India | 0.68 | 0.82 | 0.66 | 0.82 | 0.63 | 0.84 | 0.60 | **0.87** | 0.58 | 0.84 | 0.56 | 0.81 | 0.53 |
| Egypt | 0.67 | 0.63 | 0.63 | 0.62 | 0.60 | 0.61 | 0.57 | 0.62 | 0.54 | 0.65 | 0.51 | 0.69 | 0.48 |
| Argentina | 0.64 | 0.76 | 0.60 | 0.75 | 0.57 | 0.75 | 0.54 | 0.76 | 0.51 | 0.76 | 0.48 | 0.78 | 0.46 |
| Colombia | 0.53 | 0.54 | 0.51 | 0.54 | 0.48 | 0.54 | 0.46 | 0.54 | 0.44 | 0.55 | 0.42 | 0.56 | 0.40 |
| Ecuador | 0.50 | **0.50** | 0.48 | 0.47 | 0.45 | 0.43 | 0.43 | 0.43 | 0.41 | 0.43 | 0.39 | 0.42 | 0.37 |
| Australia | 0.45 | 0.59 | 0.44 | 0.67 | 0.42 | **0.71** | 0.41 | 0.70 | 0.40 | 0.62 | 0.37 | 0.57 | 0.37 |
| Sudan | 0.30 | 0.51 | 0.30 | 0.57 | 0.30 | 0.58 | 0.30 | 0.59 | 0.30 | 0.57 | 0.30 | 0.57 | 0.30 |
| Non-OPEC | | 49.96 | | 52.02 | | 51.65 | | 51.94 | | 52.20 | | 52.56 | |
| OPEC | | 34.40 | | 35.46 | | 36.10 | | 37.11 | | 37.92 | | 38.36 | |
| WORLD | | | | | | | | | | | | | |
| Regular | | | 66.04 | | 64.67 | | 63.43 | | 62.56 | | 60.85 | | 59.25 |
| Heavy | | | 3.57 | | 3.78 | | 4.00 | | 4.21 | | 4.32 | | 4.45 |
| Deepwater | | | 6.52 | | 8.53 | | 9.97 | | 11.50 | | 12.08 | | 12.04 |
| Polar | | | 0.88 | | 0.88 | | 0.88 | | 0.90 | | 0.96 | | 0.99 |
| NGL | | | 7.67 | | 7.95 | | 7.95 | | 8.22 | | 8.22 | | 8.22 |
| **WORLD** | 72 | 84 | 85 | 87 | 86 | 88 | 86 | 89 | **87** | 90 | 86 | 91 | 85 |

## Calendar - Forthcoming Conferences and Meetings

ASPO members and associates [shown in parenthesis] will be addressing the subject of Peak Oil at the following conferences and meetings. Information for inclusion in future newsletters is welcomed.

**2007**

| | |
|---|---|
| Oct. 17-20 | ASPO-USA Conference, **Houston**, Texas (See Item 823 June Newsletter) |
| Nov. 8-9 | ASPO-SOUTH AFRICA, **Johannesburg**, South Africa [Ratcliffe, Aleklett] |
| Nov. 14 | Institute of Energy, **London** [Campbell] |
| Nov 16 | Environment Kernow, Rosewarne, Cornwall, England [Campbell] |
| Nov. 15-16 | OECD International Transport Forum, **Paris**, [Aleklett, Bentley] |
| Nov. 28 | Fribourg University, Fribourg, **Switzerland** [Campbell] |
| Dec. 4-5 | VorArlberg Sustainability Conference, **Bregenz**, Austria [Campbell] |

## NOTE


*Compiled by C.J.Campbell, Staball Hill, Ballydehob, Co. Cork, Ireland.*

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Multi-Science Publishing Co. (Sciencem@hotmail.com) wish to advise that copies of the book *Oil Crisis* by C.J.Campbell, providing background reading, are still available for purchase.